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(54) Vehicle gearboxes

(57) In a motor vehicle gearbox backlash between two meshed gear wheels (16A, 16B) is damped by two bosses (22, 23) of elastomeric material which contact each other. The diameter of each boss (22, 23) is slightly greater than the pitch circle diameter of the respective gear wheel.

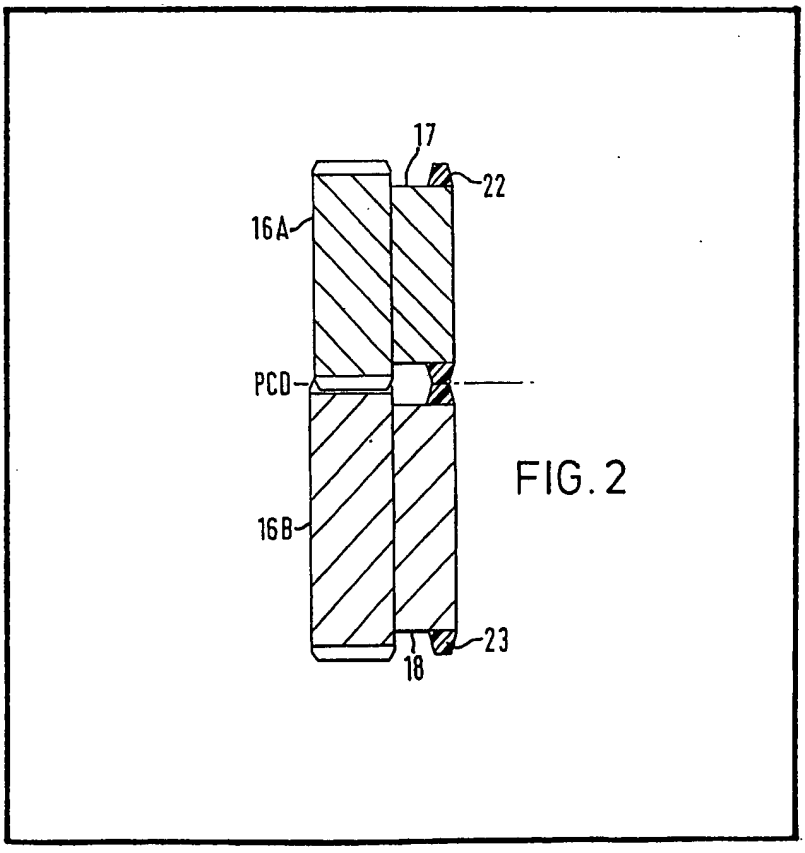

FIG. 2

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The drawing originally filed was informal and the print here reproduced is taken from a later filed formal copy.

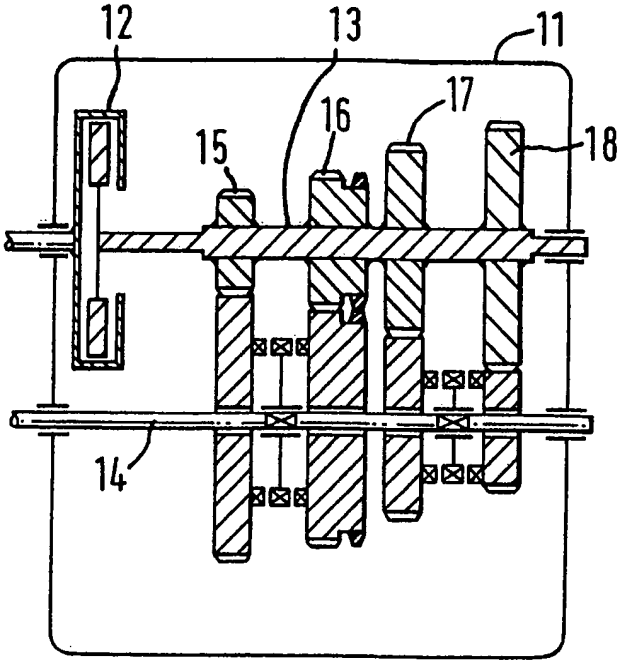

FIG. 1

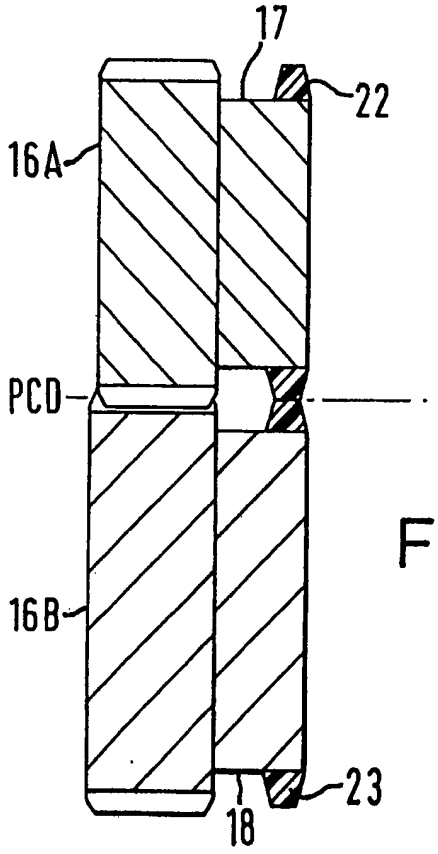

FIG. 2

SPECIFICATION

Vehicle gearboxes

This invention relates to gearboxes for, but not exclusively for, use on automobiles.

A problem arising in automobile transmission systems is a phenomenon known as gearbox idle-rattle. When the vehicle is stationary and the transmission system is under no drive loads, the fluctuation in engine velocity causes meshed gears in the gearbox to move from drive to over run and vice versa as the engine speed hunts around its idle speed. This relative movement between meshed gear pairs causes idle-rattle in the gearbox.

Earlier attempts to reduce idle-rattle, have utilised friction clutch driven plates in the transmission drive line between the vehicle engine and gearbox. To this end the friction clutch driven plate has usually been provided with a 'spring centre' which operates to absorb the fluctuations in engine velocity.

Typical earlier proposals are illustrated in the following patents:—

(a) British Patent No. 1 167 749 which provides a friction clutch driven plate having a hub centre having two sets of damping springs acting in series, a light spring set for damping out idle-rattle, and a heavy duty spring set for damping out normal drive load variations,

(b) British Patent No. 1 119 405 which utilises variable friction damping within the driven plate to cure idle-rattle, and

(c) British Patent Application No. 2 044 396 A which utilises a complicated system of centrifugally responsive lock-up means to alter the spring characteristics of the driven plate at engine idle from these characteristics when the transmission is under a drive load.

All these earlier solutions are expensive.

It is the object of the present invention to reduce gearbox idle-rattle.

Accordingly there is provided a motor vehicle gearbox in which at least one pair of meshed gear wheels have a damping means operative therebetween to oppose relative movement between the gear wheels.

Preferably the damping means is an elastomeric boss on one gear wheel which resiliently acts on the other gear wheel.

The invention will be described by way of Example and with reference to the accompanying drawings in which:—

Fig. 1 is a schematic diagram of a gearbox for a transverse engine vehicle; and

Fig. 2 is a detailed sketch of a meshed pair of gear wheels.

Now with reference to Figs. 1 and Fig. 2 a motor vehicle gearbox 11 is driven through a friction clutch 12. The gear trains are arranged as meshed gear pairs on the main shaft 13 and lay shaft 14.

The gear wheels on the main shaft are made fast thereon and the gear wheels on the lay shaft are journalled thereon for individual rotation. The gear pairs 15, 16, 17 and 18 respectively provide first, second, third, and fourth gear ratios for the vehicle transmission.

It has been found that in the gearbox most of the noise emanates from a particular pair of meshed gear wheels, and that this pair of meshed gears can be isolated by either experimental means or by theoretical calculations. For the purposes of illustration, in the gearbox 11 the second gear ratio pair of meshed gear wheels 16 have been isolated as being the pair of meshed gear wheels that produce most noise.

Each gear wheel 16A and 16B of the meshed pair 16 (see Fig. 2) has a smaller diameter portion 17 and 18 respectively which has an annular elastomeric boss 22 and 23 thereon. Each boss 22 or 23 is rather like a solid type and is rotationally fast with its respective gear wheel.

The two bosses 22 or 23 are axially aligned with each other and dimensioned to run against each other with some slight resilient loading on the gear wheels pitch circle diameter P.C.D. The exerted resilient load and frictional interference between the two bosses 22 and 23 prevents the gear teeth on the two gear wheels from chattering on each other.

Claims

1. A motor vehicle gearbox in which at least two meshed gear wheels have a damping means operative therebetween to oppose relative movement between the gear wheels.

2. A gearbox as claimed in Claim 1, wherein the damping means is an annular elastomeric boss carried on one of said wheels and which resiliently acts on the other gear wheel.

3. A gearbox as claimed in Claim 2, wherein each of the two gear wheels has an annular elastomeric boss thereon and the two bosses are axially aligned to run on each other and each acts resiliently on the other.

4. A gearbox as claimed in Claim 3, wherein the two elastomeric bosses contact each other on the gear wheel pitch circle diameter.

5. A gearbox having a meshed gear pair substantially as described herein with reference to Fig. 2 of the drawings.

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